

Recent results on crab nebula and Mkn 421 observations with tactic imaging element

N. Bhatt, For the grace team, and R. Koul

Bhabha Atomic Research Centre, Nuclear Research Laboratory, Trombay, Mumbai 400 085, India

Abstract. The Imaging Element (IE) of the 4 element TAC-TIC gamma-ray telescope array consists of a 9.5m^2 area light collector which is configured to a Davis-Cotton reflecting surface (spot size $\sim 0.2^\circ$ for on-axis incidence). It is placed on an alt-azimuth mount and is provided with a computer-controlled, two axes drive system yielding a pointing /tracking accuracy < 3 arc-minutes. The front end detector assembly of the IE deploys a photomultiplier tube (PMT) based Cerenkov light imaging camera, consisting of 349 PMT pixels arranged in a truncated square matrix (19×19). The camera provides a uniform pixel resolution of $\sim 0.31^\circ$ over a rather large field of view (FoV) of $\sim 6^{\text{circ}} \times 6^\circ$. The innermost 240 pixels of the camera (15×16 matrix, FoV $\sim 4^\circ \times 4^\circ$) are utilized for generating event triggers, based on a topological trigger-generation scheme demanding a simultaneous ($\sim 20\text{ns}$ resolution) firing of Nearest Neighbour Non-Collinear

Triplet (3NCT) pixels. 4 calibration pixels, located symmetrically at the 4 edges of the imaging camera are provided with Am^{241} isotope based light pulsers for in-situ absolute calibration of the imaging camera. The IE equipped with full 349 pixel imaging camera, as discussed above, was utilized recently for observations on the TeV gamma-ray standard candle source Crab Nebula and the BL Lac object Mkn 421 in the conventional on-source/off-source tracking mode. Analysis of the recorded images reveals presence of significant signals from both these sources. Observations are still continuing on these objects. Updated results would be presented at the conference alongwith important implications thereof on both the IE instrument and the underlying source astrophysics.